DOCUMENT RESUME

ED 124 426 SE 020 985

TITLE	National Energy Outlook: 1976 Executive Summary.
INSTITUTION	Federal Energy Administration, Washington, D.C.
REPORT NO	FEA/N-76/100
PUB DATE	76
NOTE	17p.; The 1976 NATIONAL ENERGY OUTLOOK, of which this Executive Summary is a part is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Stock No. 041-018-00097-6, $7.30); Not available in hard copy due to color-coded charts and graphs
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (Stock No. 041-018-00102-6, $0.60; minimum charge of $1.00 for each mail order)
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	Economic Development; Economic Factors; *Energy; Environment; *Fuel Consumption; *Fuels; *Prediction; *Research; Utilities

ABSTRACT

This brochure begins with findings and conclusions of the 1975 NATIONAL ENERGY OUTLOOK. Discussions of national energy topics follow, including: What Are the Roots of Our Energy Problem? How Did We Become So Vulnerable to Oil Imports?; How Much Energy Will the Nation Consume?; How Will the National Meet Its Growing Energy Demands by 1985; How Much Energy Can be Saved; What Will Oil Imports Be by 1985; Where Will New Oil Supplies Come From?; How Do Reserves Affect Domestic Production?; Will Natural Gas Production Continue to Decline?; Where Will New Coal Production Come From?; What Will Be the Sources of Electricity in the Future?; How Much Can New Technologies Contribute?; and How Much Will Energy Supply Investment Cost? Each one-page discussion includes depiction of the pertinent facts via multicolored graphs. (RE)

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1976 National Executive Energy Summary Outlook

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Findings and Conclusions

- The 1974 **Project Independence Report** has been revised to incorporate the latest information on energy prices, legislation, and resources.

- The events of 1975 have changed the energy outlook:

  —Energy legislation has been enacted which largely removes the oil depletion allowance, sets a new oil pricing policy, establishes conservation measures and provides standby authorities in the event of another embargo.

  —New Federal estimates of oil and gas resources are substantially lower than previous figures.

  —Further increases in the price of imported oil have occurred and the possibility of a rapid drop in price now seems remote.

  —Higher energy prices have spurred the search for oil and gas and dramatically cut the rate of growth in energy demand.

- This year's FEA analysis shows that even with these changes energy independence can still be achieved:

  —Over the next 10 years, the Nation can greatly expand its domestic energy production and cut the rate of growth in energy demand, and still meet its economic objectives.

  —Our dependence in the next few years would have increased, but the recently enacted legislation will hold our vulnerability to about current levels.

  —The post-1985 prospects for maintaining independence are less certain, unless technological and economic breakthroughs occur.

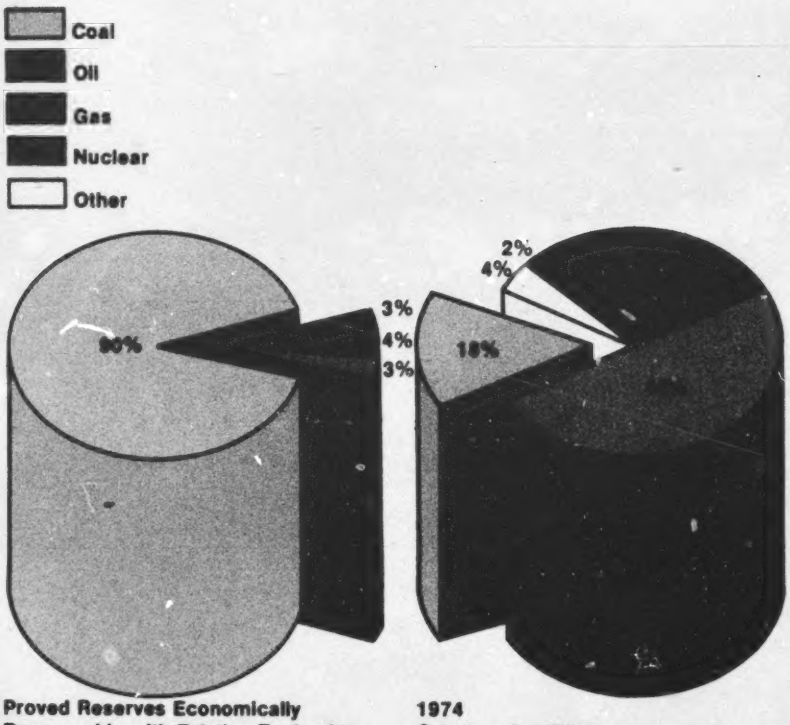
- If we do not establish policies to stimulate domestic energy production and cut energy use, or if regional growth restrictions, less reserves than expected, or extended price controls occur, our dependence on foreign oil could rise dramatically above today's levels.

  —The uncertainties and energy impacts associated with each of these factors are large and make accurate forecasting difficult.

  —But unless the Nation weighs the impact of alternative policy assumptions, it cannot choose a national energy policy which balances economic, energy, environmental, and social objectives.

- The figures which follow briefly summarize the major findings of this year's **National Energy Outlook.**

What Are the Roots of Our Energy Problem?



Proved Reserves Economically Recoverable with Existing Technology

1974 Consumption Pattern

- The vast reserves of coal in the United States amount to three times the energy contained in the Middle East's oil reserves, and currently account for more than 90 percent of U.S. proved energy reserves.

- Yet, over the last 75 years, the United States has switched from using coal for over 90 percent of its energy needs to depending on oil and gas for 75 percent of its energy.

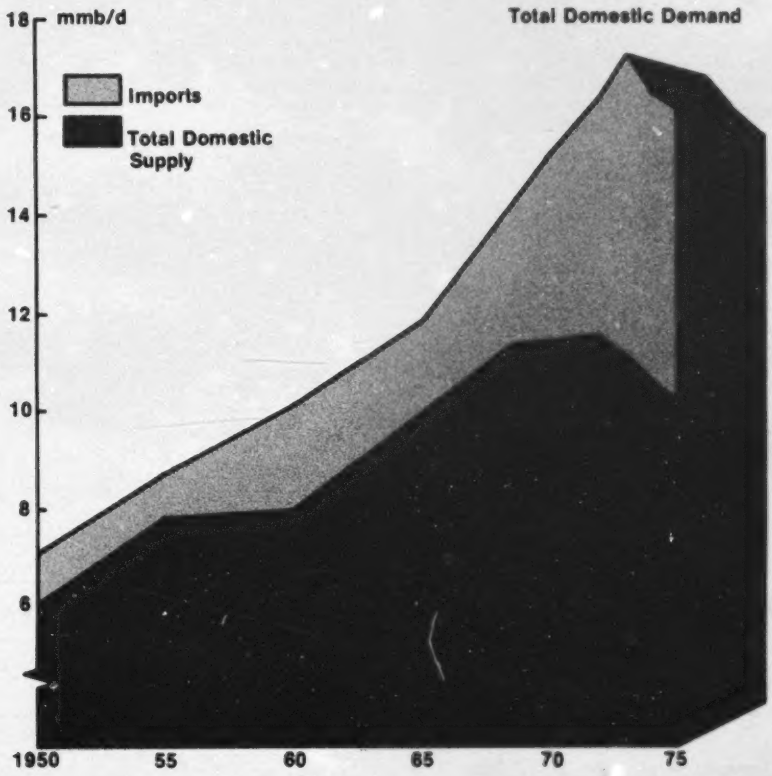
- Thus, *the Nation depends upon its least abundant energy resources to provide most of its energy needs.*

- The result has been a growing dependence on imported energy, the availability and price of which are controlled by a few Middle East countries.

- Our task between now and 1985 is to find and develop more oil and gas and stimulate conservation to offset currently dwindling production of these fuels, as our economy is converted to the more abundant resources, such as coal and nuclear power.

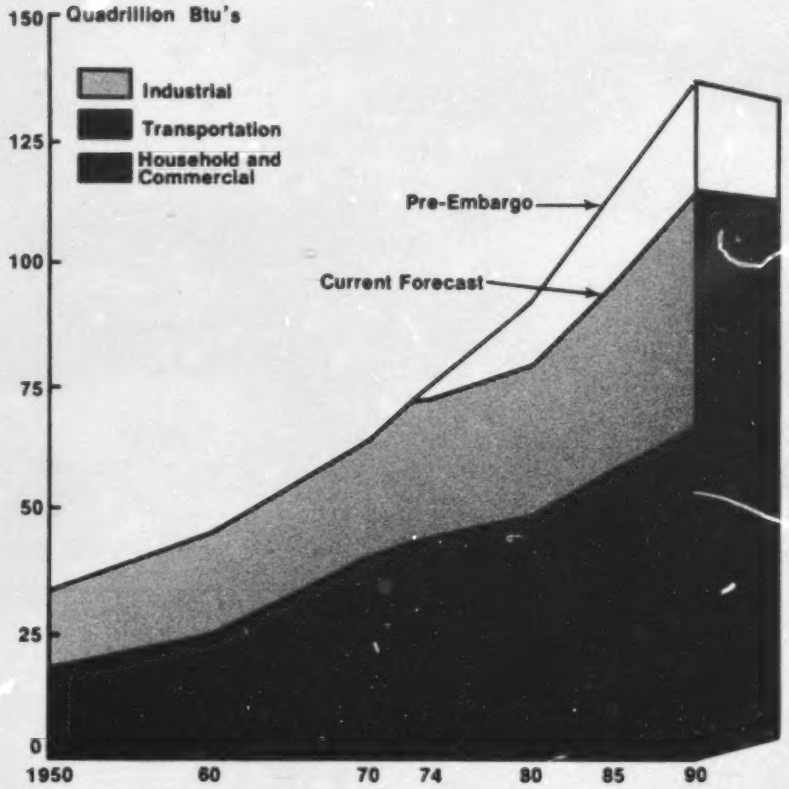
- In the post-1985 period, our task is to develop new technologies that can dramatically expand our economically usable reserves of shale oil and uranium, and to make greater use of nondepletable resources, such as solar and geothermal energy.

How Did We Become So Vulnerable To Oil Imports?



- The availability of inexpensive imported oil served as a disincentive to domestic production, which peaked at 9.6 million barrels per day (MMB/D) in 1970, has been declining ever since, and now stands at 8.2 MMB/D.
- Meanwhile, petroleum demand grew at an annual rate of 4.6 percent in the 1960's and early 1970's, in response to low prices, air pollution restrictions on coal use, and the growing use of automobiles.
- The combination of declining domestic production and rising demand led to a rapid growth in imports:
  - —From 1.8 MMB/D, or 19 percent of consumption, in 1960.
  - —To 3.4 MMB/D, or 23 percent of consumption, in 1970.
  - —To 6.0 MMB/D, or 37 percent of consumption, in 1975.
- The Arab oil embargo in 1973/74 demonstrated that the United States is vulnerable to severe supply disruptions and oil price increases.
- Today, the United States spends about $27 billion, or $125 per person, for imported oil; as compared with about $3 billion, or $15 per person, in 1970.

How Much Energy Will the Nation Consume?



- Energy demand grew at a rate of 3.6 percent in the 20 years before the 1973 embargo, and in 1975 the United States consumed about 73 quadrillion Btu (quads).

  —Electricity consumption grew at twice the rate of all energy demand (about 7 percent per year).

- *By 1985, as a result of higher prices, energy demand will be much lower*—even with economic expansion—*than if historic growth rates had continued.*

  —With a continuation of current oil prices (about $13 per barrel in 1975 dollars), demand will be 98.9 quads in 1985—a 2.8 percent growth rate.

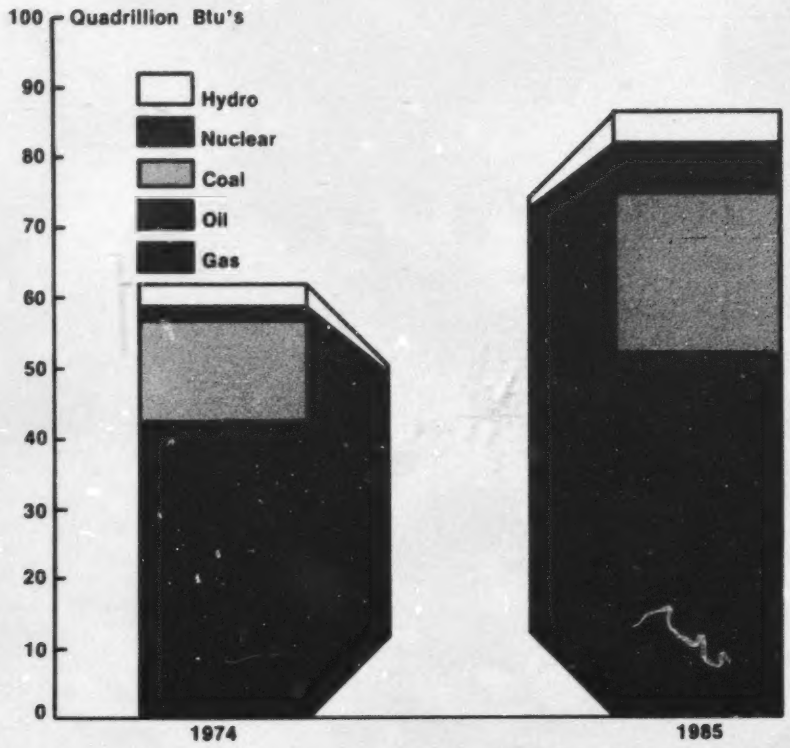
  —Electricity will still grow about twice as fast as overall energy demand, but at reduced levels of 5.4 percent per year.

  —Consumption will gradually shift from oil and gas to coal and nuclear power.

- If world oil prices decline to $8 per barrel, or if oil and gas prices are regulated substantially below market prices, energy demand will grow faster—at an annual rate of between 3.0 and 3.2 percent.

- The greatest reductions in energy growth will be in the Household/Commercial and Transportation Sectors, which will respond most sharply to higher energy prices.

How Will the Nation Meet Its Growing Energy Demands by 1985?



- Total domestic supply is forecast to increase by 40 percent between now and 1985, with all major fuels playing a large role:

  —*Coal production could increase to over one billion tons,* from current levels of 640 million tons.

  —*Oil production could reach 13.9 MMB/D* (including natural gas liquids), if Outer Continental Shelf leasing is strongly pursued and market prices prevail.

  —*Natural gas production could reach 22.3 trillion cubic feet* (Tcf) if new gas prices are deregulated, but could be 17.9 Tcf under current regulations.

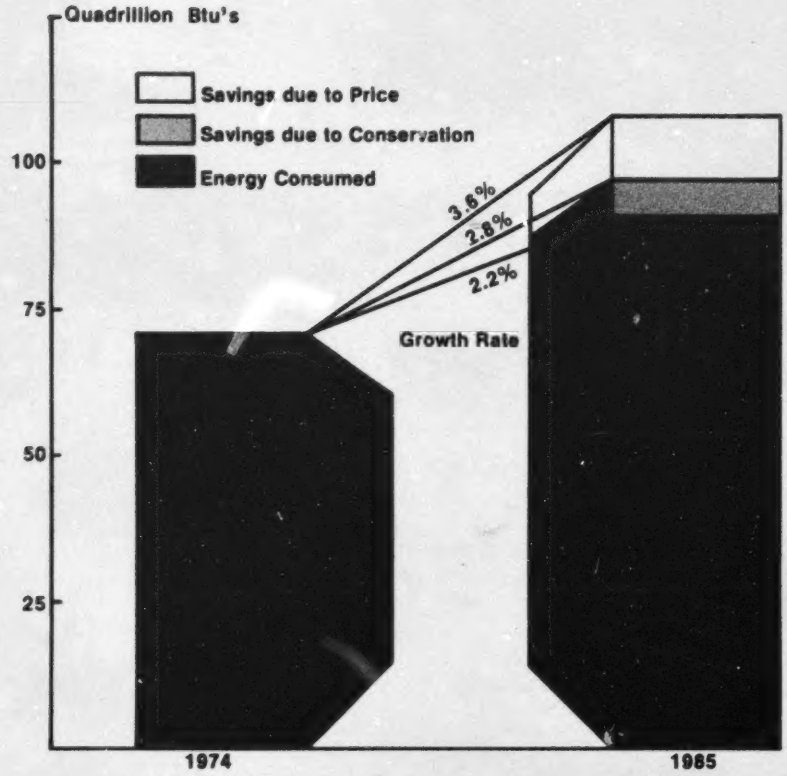
  —Although *nuclear power* has experienced significant delays, it *could grow from current levels of 8.6 percent to about 26 percent of electricity generation.*

  —Emerging technologies such as the conversion of coal into oil or gas, solar, and geothermal energy, will be important in the post-1985 period, but will not produce much energy in the next ten years.

- Each of these supply increases, while technically and economically feasible, requires significant growth of the energy producing sectors and will not be forthcoming unless pricing and government regulatory policies encourage it. Institutional barriers and policy uncertainty will also delay development.

- If one or more domestic energy sources do not achieve these projected levels, imports will make up the shortage because other domestic fuel sources could not compensate for the loss.

How Much Energy Can Be Saved?



- Higher energy prices should significantly cut energy demand growth during the next 10 years, reducing the growth rate to 2.8 percent from the historical rate of 3.6 percent.

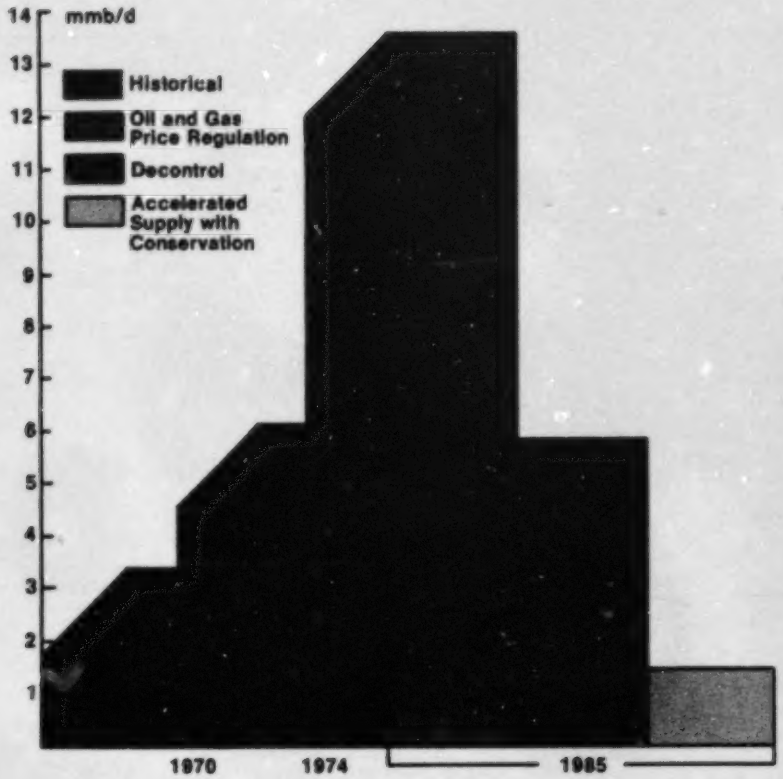
- *An active conservation program could further reduce energy demand by the equivalent of 3 million barrels per day,* reducing the annual energy growth rate to 2.2 percent through 1985.

  —Savings could be achieved in all the major sectors: residential, commercial, industrial, and transportation.

  —Actions which improve energy efficiency of automobiles, homes, and office buildings would have the greatest impact in the next 10 years.

- While conservation can reduce energy demand, it does not appear feasible to cut the growth rate to zero or to obviate the need for expanding existing supplies of energy.

What Will Oil Imports Be by 1985?



- Imports will continue to increase in the next 2 years, until Alaskan oil production begins.

  —There is little that can be done to cut imports through 1977, although conserving energy and increasing oil recovery in existing fields will provide some help.

- We have much greater ability to cut imports by 1985, if appropriate policy actions are taken:

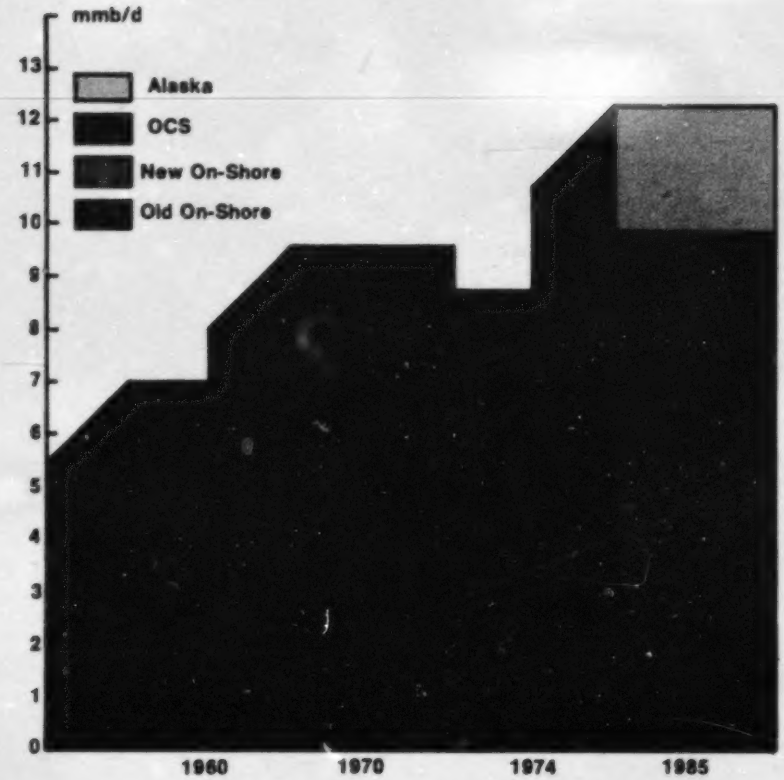
  —If oil and gas prices are regulated at low levels, imports could reach 13.5 MMB/D in 1985.

  —With gradual deregulation of oil and gas prices, and a continuation of current world oil prices, imports could drop to 5.9 MMB/D, slightly below today's level.

  —A maximum effort to increase supply and cut demand could reduce imports to about 1 MMB/D, making the United States invulnerable by 1985.

- By 1990, however, imports could increase as domestic production from older fields again declines. This decline will need to be offset by the growing use of nuclear power, synthetic fuels, solar, and other emerging technologies.

Where Will New Oil Supplies Come From?



- *Domestic crude oil production could increase to 12.3 MMB/D in 1985* (From 8.8 MMB/D in 1974), if today's market prices are allowed to stimulate domestic production and if an aggressive OCS leasing and development program is followed.

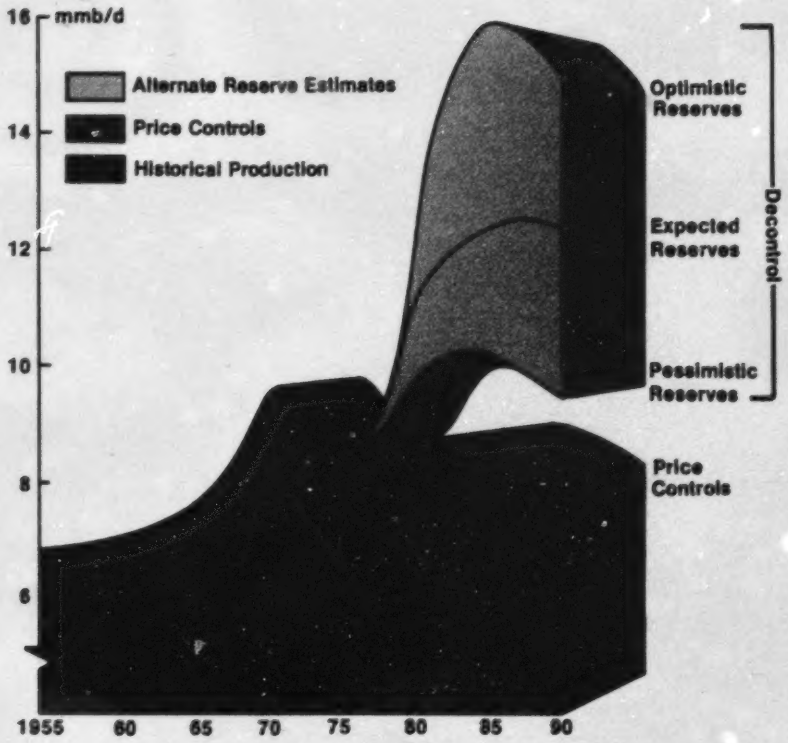
- While total production will exceed today's levels, *oil supply from existing onshore reserves could decline to 2.4 MMB/D by 1985,* as older fields are depleted.

  --But, more intensive use of secondary and tertiary recovery in current fields and new discoveries onshore can keep onshore production about constant.

- If the current OCS leasing and development schedules are followed, *OCS production could about double by 1985,* to about 2.3 MMB/D.

- *Alaska will be the greatest new source of production,* increasing to about 2.4 MMB/D by 1985.

How Do Reserves Affect Domestic Production?



- The amount of oil we discover and produce depends on how much oil is in the ground (reserves) and whether oil prices are high enough to justify its production.

- If oil prices remain at current levels and the Federal Government's best estimate of known and expected reserves proves correct, *domestic production could reach 12.3 MMB/D (or 13.9 MMB/D including natural gas liquids) by 1985 and would begin to decline in the late 1980's.*

- *If world prices fall to $8 per barrel or domestic prices are regulated over a long period, production is never likely to be much above today's levels,* and will decline again in the early 1980's. Crude production could be as low as 8.3 MMB/D in 1985 under these circumstances.

  —This decline will occur because the more expensive enhanced recovery techniques and some frontier area production, such as that from Alaska, would not be economic at lower prices.

- It is highly uncertain how much oil remains to be found and produced:

  —If reserves are much lower than expected, production could not peak much above historic levels and would decline rapidly thereafter, even at high world oil prices.

  —If reserves are much higher than expected, oil production could be maintained at least at today's levels for many years.

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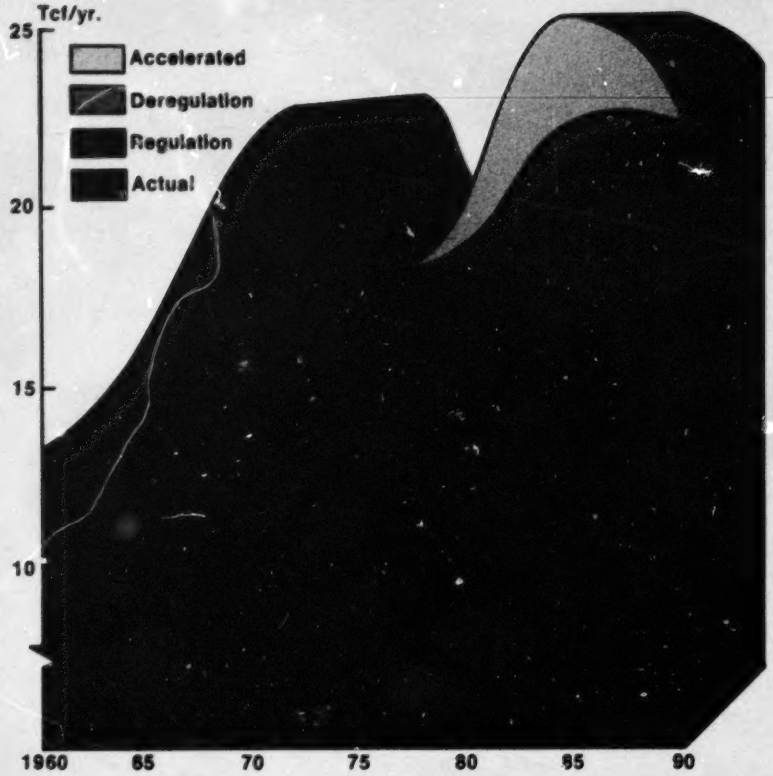
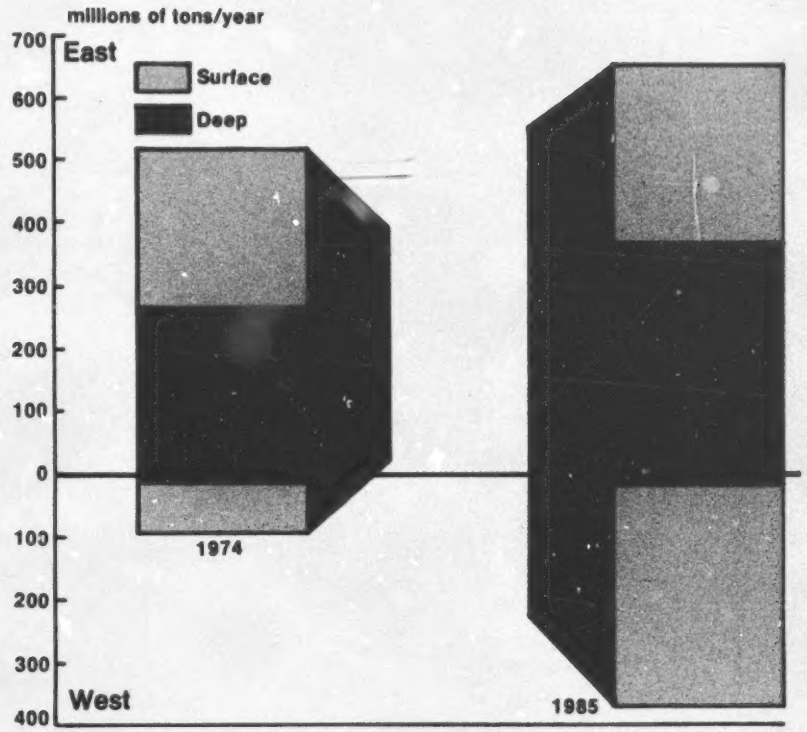


Will Natural Gas Production Continue to Decline?

- *Natural gas production can be expected to decrease during the next few years, but then increase to 22.3 Tcf in 1985 if prices are deregulated (as compared with 20.1 Tcf in 1975).*
  - —Most of the new gas production will come from the Gulf of Mexico and intensive production from onshore fields.
  - —If OCS leasing is accelerated and resource availability proves more favorable than expected, natural gas production could reach 25.5 Tcf in 1985.
- *If present regulations continue, natural gas production could decline to 17.9 Tcf in 1985.* The lower the price, the more rapid will be the decline in natural gas exploration and production.
- Because of limited reserves and uncertain supplemental gas supplies, natural gas production is likely to peak in the 1980's and probably decline again.
- *Supplemental gas supplies could play an important role in the 1980's and later:*
  - —Gas from Alaska could supply over 1 Tcf before 1985, if needed transportation systems are completed.
  - —Liquefied natural gas could supply about 2 Tcf by 1985.
  - —If financial incentives are provided, over 1 Tcf of synthetic gas could be delivered by 1985, and this source could supplement dwindling supplies of naturally occuring gas in the post-1985 period.

Where Will New Coal Production Come From?



- *Coal production is projected to increase from 603 million tons in 1974 to 1040 million tons in 1985.*

  —Coal production will increase more slowly if long-term utility demand is uncertain and if major environmental and transportation issues are unresolved.

  —More coal probably could be produced, but will not be because its markets are limited primarily by the growth in electric power and synthetic fuels.

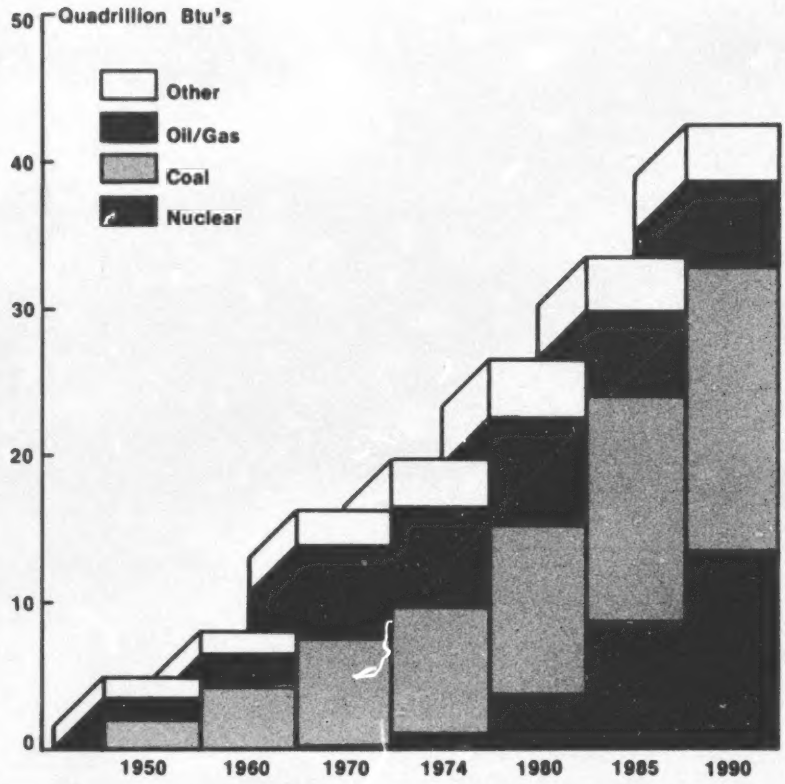
- *The major expansion of production will occur in the Western regions,* increasing from 92 million tons in 1974 to about 380 million tons in 1985.

  —Western coal production will continue to be mainly surface mining.

- *Eastern mining could expand by about 30 percent.*

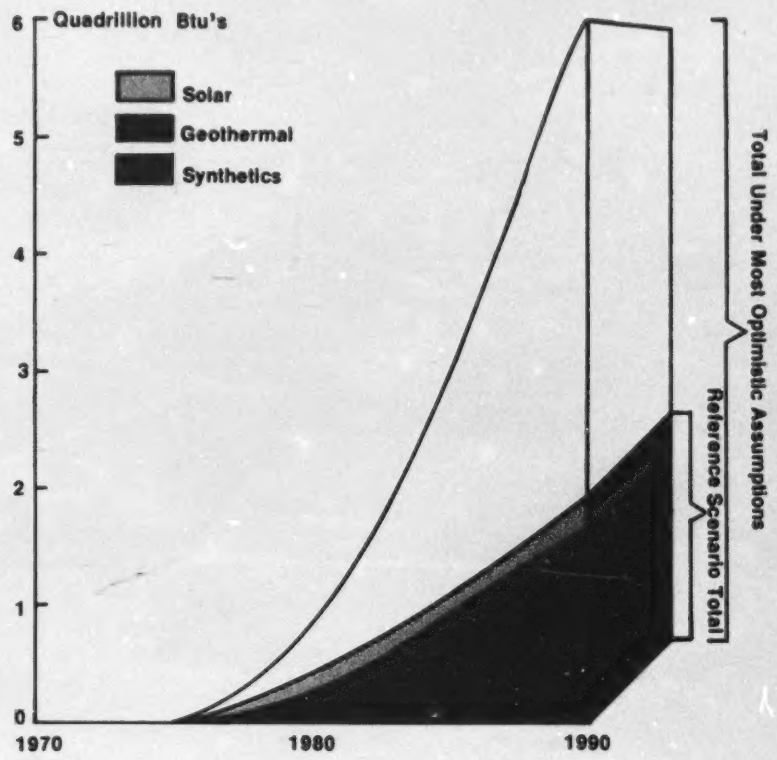
  —Underground mining should reverse recent trends and increase more than surface mining in the East, since low-cost surface reserves are being depleted.

What Will Be the Sources of Electricity in the Future?



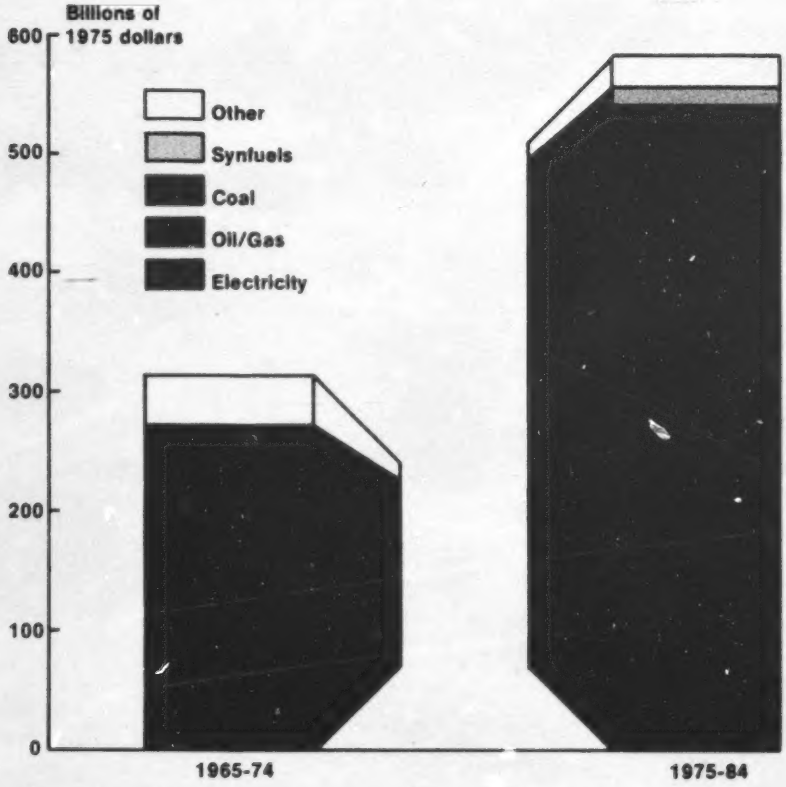
- *Electricity could continue to grow at about twice the rate of total energy demand; but its growth rate will be reduced to about 5.4 percent,* compared with its historical rate of about 7 percent.
- The use of natural gas and oil to generate baseload electricity could be phased out due to higher prices, and be replaced with less expensive nuclear and coal-fired power.
- *Coal's use in electric generation could increase by 77 percent in the next 10 years.*
  —Over 700 million tons of coal could be used to generate electricity in 1985, as compared with 392 million tons in 1974.
- *Nuclear energy could represent about 26 percent of electric power generation in 1985,* as compared with 8.6 percent in 1975.
  —However, nuclear power accounts for a 30 percent smaller contribution than previously projected, reflecting actual cancellations and deferments caused by reductions and uncertainty in demand growth, financial difficulties, and licensing delays.
- Electricity will represent a continually increasing share of energy in the future, rising from 28 percent in 1974 to 37 percent in 1990.

How Much Can New Technologies Contribute?



- Solar, geothermal, and synthetic fuels will make only a small contribution to domestic energy supplies by 1985 (about 1 percent).
- *The major contribution from solar, geothermal, and synthetic fuels will not be felt until after 1990.*
- The technology for these sources exists, but must be proven economically viable on a commercial scale. It will take several years to build the first full-size plants; hence a large industry will not be possible during the next 10 years.
- It is likely that few, if any, synthetic fuel plants will be built by 1985 without Federal financial assistance.
- Unless commercial size plants are started now and proven economic by 1985, it will not be possible for these new sources to replace dwindling supplies of oil and gas in the post-1985 period.

How Much Will Energy Supply Investment Cost?



- *Energy investments in the United States will be about $580 billion (in 1975 dollars) in the next 10 years.*

  —While this investment seems large, it is about 30 percent of fixed business investment, which is energy's historical share.

  —In certain sectors, such as utilities, large demands will be placed on the capital markets.

- Oil, gas, and electric utility capital spending will almost double in the next 10 years.

- The largest portion of the energy investment will be in the electric utility sector which could account for 47 percent of the total.

- Oil and gas investment depends greatly on the pricing and policy strategies that are adopted and could range from about $160 to $315 billion.

- Coal investment could increase to $18 billion or only 3 percent of the total, but representing a 200 percent increase from the 1965-1974 total of $6 billion.

- *Investments to increase energy efficiency could also be significant, perhaps an additional $250 billion through 1985.*

  —Conservation investments are difficult to separate from non-energy investments and will be spread throughout the economy.

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